

FORM PTO-1390 (REV 10-2000)		U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE		ATTORNEY'S DOCKET NUMBER	
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371				MAT-8048US	
				U.S. APPLICATION NO. (if known, see 37 CFR 1.5)	
INTERNATIONAL APPLICATION NO. PCT/JP00/01569		INTERNATIONAL FILING DATE 15 March 2000 (15.03.00)		To Be Assigned 09/700474	
				PRIORITY DATE CLAIMED 18 March 1999 (18.03.99)	
TITLE OF INVENTION METHOD OF CREATING A PLURALITY OF PARTITIONS ON REMOVABLE DEVICE					
APPLICANT(S) FOR DO/EO/US Akiyoshi Yamashita					
Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:					
<ol style="list-style-type: none"> 1. <input checked="" type="checkbox"/> This is a FIRST submission of items concerning a filing under 35 U.S.C. 371. 2. <input type="checkbox"/> This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371. 3. <input checked="" type="checkbox"/> This is an express request to promptly begin national examination procedures (35 U.S.C. 371(f)). 4. <input type="checkbox"/> The US has been elected by the expiration of 19 months from the priority date (PCT Article 31). 5. <input checked="" type="checkbox"/> A copy of the International Application as filed (35 U.S.C. 371(c)(2)) <ol style="list-style-type: none"> a. <input checked="" type="checkbox"/> is attached hereto (required only if not communicated by the International Bureau). b. <input type="checkbox"/> has been communicated by the International Bureau. c. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US). 6. <input checked="" type="checkbox"/> An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)). 7. <input checked="" type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)) <ol style="list-style-type: none"> a. <input type="checkbox"/> are attached hereto (required only if not communicated by the International Bureau). b. <input type="checkbox"/> have been communicated by the International Bureau. c. <input type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired. d. <input checked="" type="checkbox"/> have not been made and will not be made. 8. <input type="checkbox"/> An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)). 9. <input checked="" type="checkbox"/> An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)). 10. <input type="checkbox"/> An English language translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)). 					
Items 11 to 16 below concern documents(s) or information included:					
11. <input checked="" type="checkbox"/> An Information Disclosure Statement under 37 U.S.C. 1.97 and 1.98.					
12. <input type="checkbox"/> An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.					
13. <input checked="" type="checkbox"/> A FIRST preliminary amendment. <input type="checkbox"/> A SECOND or SUBSEQUENT preliminary amendment.					
14. <input type="checkbox"/> A substitute specification.					
15. <input type="checkbox"/> A change of power of attorney and/or address letter.					
<input checked="" type="checkbox"/> Other items or information: International Search Report dated May 23, 2000; English Translation of International Search Report					

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: A. Yamashita : Art Unit:
Serial No.: To Be Assigned : Examiner:
Filed: Herewith :
FOR: METHOD OF CREATING A :
PLURALITY OF PARTITIONS ON
REMOVALBE DEVICE

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

S I R :

Prior to examination, please amend the above application as follows:

IN THE SPECIFICATION:

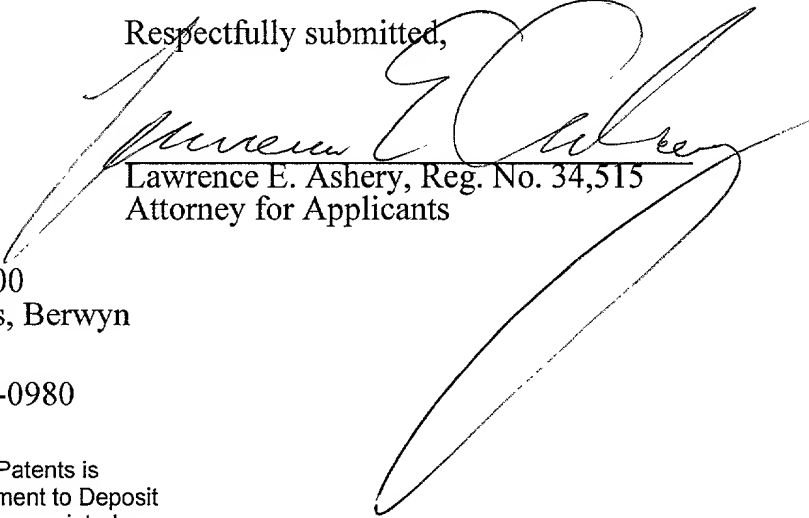
After the title and before the first paragraph, please insert --THIS APPLICATION IS A U.S. NATIONAL PHASE APPLICATION OF PCT INTERNATIONAL APPLICATION PCT/JP00/01569--.

On pages 4-5, lines 25-1, please delete "gaining access to connection of peripherals with the computer base unit 100" and substitute therefore --connecting the computer-base unit 100 to peripheral devices, and for accessing from the computer-base unit 100 to the connected peripheral devices--.

IN THE DRAWINGS:

Please delete page "5/5" of the drawings, also labeled as "Reference Numerals" in its entirety. Further, please delete pages "2/5", "3/5", and "4/5" replace with the amended figures attached hereto.

Respectfully submitted,


Lawrence E. Ashery, Reg. No. 34,515
Attorney for Applicants

LEA/lm

Dated: November 15, 2000
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The Assistant Commissioner for Patents is hereby authorized to charge payment to Deposit Account No. **18-0350** of any fees associated with this communication.

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I hereby certify that this paper and fee are being deposited, under 37 C.F.R. § 1.10 and with sufficient postage, using the "Express Mail Post Office to Addressee" service of the United States Postal Service on the date indicated above and that the deposit is addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231.

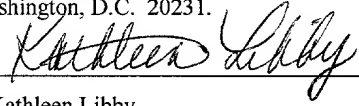

Kathleen Libby

Fig.2

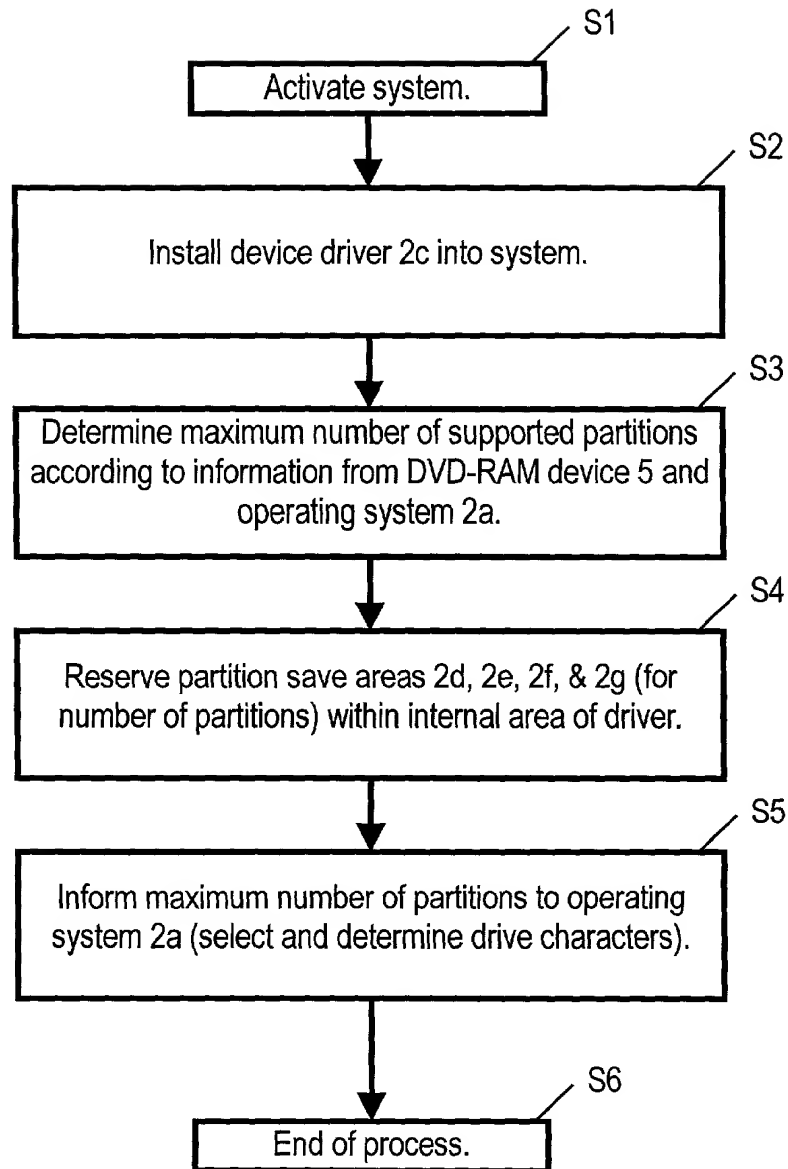


Fig.3

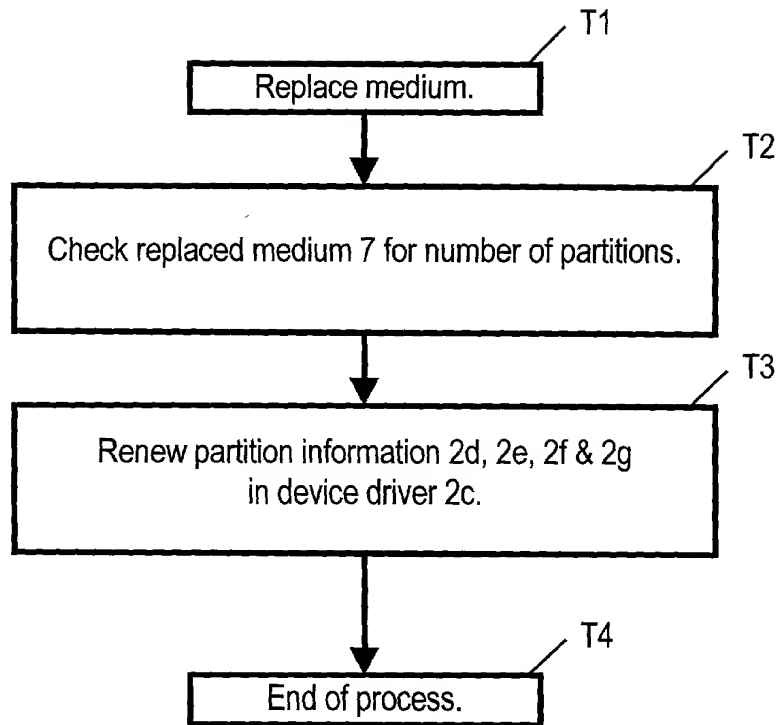
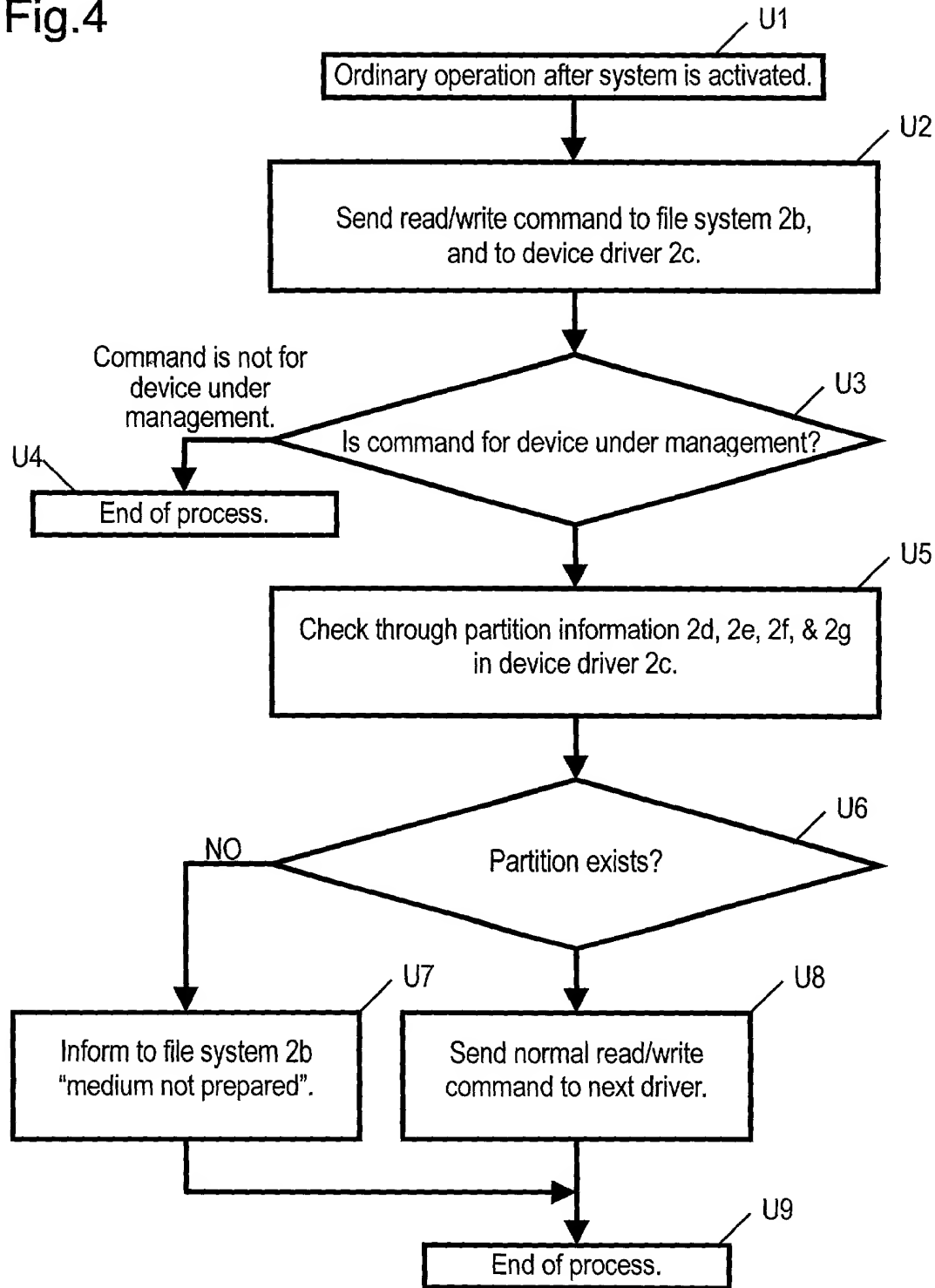


Fig.4



DESCRIPTION

Method of creating a plurality of partitions on removable device

Field of the Invention

5 The present invention relates to a digital computer in general / a
data processing device (international patent classification G06F 15/00)
capable of managing a mass storage area through a realization of
interchangeability of recording media by means of a device driver to
make an operation system recognize a removable device as a plurality of
10 devices.

Background of the Invention

15 In a conventional device driver, when a plurality of record
partitions (hereinafter referred to simply as "partition") are allocated on
a recording medium (hereinafter referred to simply as "medium") loaded
in a removable device such as a DVD-RAM device, drive letters
managed by an operating system are changed every time the medium is
replaced if a replacement medium is allocated with a different number of
partitions. That is, in the case of an operating system not capable of
20 changing drive letters dynamically at each time the medium is replaced,
it can not manage the drive letters with regard to partitions in each of the
devices and a variety of other devices besides that device.

25 It is therefore necessary for both of the loaded medium and the
replacement medium to have only one partition. Or, the computer
system has had to be turned off once, when a medium having a number of

partitions different from that of the loaded medium is replaced.

In other words, it has often been a common practice to use interchangeable media having one partition as described above, rather than dividing them with partitions, when the computer system is
5 operated by the current operating system.

However, there has been a problem that it is not possible to read linked data, when a drive letter for the same device is changed every time the medium loaded in the removable device is replaced.

Moreover, there has been a demand in recent years for devices that
10 do not require restarting of a computer system, when the devices are newly connected thereto. Such devices include those devices that conform to new standards such as the USB and the IEEE-1394. It is a retrogressive movement against the times, if a restart is needed every time a medium loaded in the removable device is replaced.

15 In addition, there has been advancement of recording media toward larger capacity, and DVD-RAM devices and the like are spreading widely for use with interchangeable media. When it becomes possible for one medium to record a large mass of data, storage areas (holder names) of the data, which have otherwise been stored in a plurality of
20 media in the past, tend to overlap easily. Therefore, there has been a demand that data need to be arranged separately into divided partitions according to their categories.

Disclousure of the Invention

25 In order to solve the above problem, a method of the present

invention to form a plurality of partitions in a removable device comprises the steps of:

rendering a device driver to make an operation system recognize a DVD-RAM device as if there were connected a plurality of drives like 2GB + 2GB + 1.2GB; and

managing a replaced medium as a single drive, if there is only one partition in the medium, and treating the two remaining drives as not loaded with any media.

The above method of creating partitions is adaptable even for the FAT file system such as the Windows (registered trademark of Microsoft Corporation, U.S.A.), for example.

The present invention pertains to a method of creating a plurality of partitions in a removable device, which is characterized by:

communicating between an operating system and its device driver in a computer system supporting connection of a removable device; and

allocating a plurality of drive letters to a single unit of the removable device, when the device driver allocates drive letters to the operating system.

This method of the invention provides one partition for each drive by having the single unit of removable device recognized as a plurality of drives, regardless of presence or absence of a medium loaded in the removable device. Accordingly, a plurality partitions can be thus formed in the removable device.

Brief Description of the Drawings

Fig. 1 is a configuration of a computer system in an exemplary embodiment of the present invention;

Fig. 2 is a flow chart showing an operation when a device driver for controlling a partition is installed into an operating system upon
5 activation of the computer system in the exemplary embodiment of this invention;

Fig. 3 is another flow chart showing an operation when a medium is loaded into a removable device or another medium different from the one loaded is replaced, after activation of the computer system in the
10 exemplary embodiment of this invention; and

Fig. 4 is still another flow chart showing an operation when the operating system or a file system issues read / write commands to the device driver, after activation of the computer system in the exemplary
15 embodiment of this invention.

Description of the Preferred Embodiments

An exemplary embodiment of the present invention will be described hereinafter with reference to Fig. 1 through Fig. 4.

20 A computer system of this exemplary embodiment shown in Fig. 1 comprises:

- a) a computer-base unit 100 comprised of a CPU ("Central Processing Unit") 1 serving as a center component of a computer and a RAM 2;
- 25 b) an adapter 3 for gaining access to connection of peripherals

with the computer-base unit 100;

c) a hard disk drive 4 in connection with the computer-base unit 100 through the adapter; and

d) a DVD-RAM device 5 representing a removable device in connection with the computer-base unit 100 through the adapter.

The DVD-RAM device 5, i.e. a removable device, is loaded with a DVD medium 6 having a capacity of 5.2GB, for example. Besides, there may be a case that the DVD-RAM device 5 is used with another DVD medium of 2.6GB in capacity after replacing the DVD medium 6 loaded therein.

Referring now to a flow chart of Fig. 2, an operation of the computer system of Fig. 1 will be described.

S1: The computer system is activated.

S2: With an activation of the computer system, an operating system 2a, a file system 2b, and a partition control device driver 2c (hereinafter simply referred to as "DDPC") for the DVD-RAM device 5 are installed into the RAM 2 of the computer-base unit 100.

S3: The operating system 2a and the file system 2b allocate a drive letter to the hard disk drive 4 through the adapter 3, and they gives a command against the DDPC 2c for allocation of drive letters to the DVD-RAM device 5. The DDPC 2c, in response to the command, stores in the operating system 2a and the file system 2b, a maximum number of partitions that can be handled

regardless of whether or not a DVD medium is loaded in the DVD-RAM device 5.

S4: The DDPC 2c then reserves areas corresponding to the maximum number of partitions within an internal work area of the DDPC 2c. These areas are, for example:

a partition information save area (hereinafter referred to as "PISA") 1, represented by a reference symbol 2d;

a PISA 2 shown by a reference symbol 2e;

a PISA 3 shown by a reference symbol 2f; and

a PISA 4 shown by a reference symbol 2g, as shown in Fig. 1.

S5: The operating system 2a subsequently allocates to the DVD medium 6 in the DVD-RAM device 5, a plurality of drive letters such as:

a drive G shown by a reference symbol 6a;

a drive H shown by a reference symbol 6b;

a drive I shown by a reference symbol 6c; and

a drive J shown by a reference symbol 6d, as shown in Fig. 1.

S6: The process ends.

In an architecture shown in Fig. 1, if there are connected only a drive C of the hard disk drive 4 as a medium of fixed device, and one unit the DVD-RAM device 5 as a removable device, for instance, a combination of drive letters of the computer system consists of:

C: the hard disk drive 4;

D: PISA 2d in the DVD-RAM device 5;

E: PISA 2e in the DVD-RAM device 5;

F: PISA 2f in the DVD-RAM device 5; and

G: PISA 2g in the DVD-RAM device 5.

In some of operation systems, there is a limitation restricting a maximum number of four partitions per each unit of removable devices, if there is a probability that up to four units of the hard disk drive 4 are connected to a drive C through a drive F. When the computer is restarted after four units of the hard disk drive 4 are connected in total, then the combination of drive letters becomes:

C: the hard disk drive 4;

D: the hard disk drive 4;

E: the hard disk drive 4;

F: the hard disk drive 4;

G: the PISA 2d of the DVD-RAM device 5;

H: the PISA 2e of the DVD-RAM device 5;

I: the PISA 2f of the DVD-RAM device 5; and

J: the PISA 2g of the DVD-RAM device 5.

In this case, the combination of the drive letters comes to be different from those of the earlier example above, even for the same partition information save areas of the same DVD-RAM device 5.

Therefore, an operator specifies drive letters in advance, such as G through J for the four units of DVD-RAM device 5, for instance, so as to designate:

C: the hard disk drive 4;

G: the PISA 2d of the DVD-RAM device 5;

H: the PISA 2e of the DVD-RAM device 5;

I: the PISA 2f of the DVD-RAM device 5; and

J: the PISA 2g of the DVD-RAM device 5.

If the computer system is so composed as to allow the operator to allocate arbitrary letters as drive letters, in consideration of a number of devices that can be connected as add-ons and the like, a combination of the drive letters allocated to the DVD-RAM device 5 does not change even if the computer is restarted after connecting four units of the hard disk drive 4 in total.

Further, if there are many devices to be connected to the computer system, it may be appropriate to allocate low priority letters S to V to one DVD-RAM device 5, and letters W to Z to a second DVD-RAM device 5, as their drive letters.

Subsequent to the foregoing operation of Fig. 2, described hereinafter pertains to an operation when a new DVD-RAM medium 6 of 5.2GB is loaded now into the DVD-RAM device 5, according to Fig. 3.

T1: A DVD-RAM medium 6 having a capacity of 5.2GB is newly loaded.

T2: The DDPC 2c initializes all of the PISA's 2d, 2e, 2f, and 2g within the driver. The DDPC 2c then checks a number of partitions of the loaded DVD-RAM medium 6 of 5.2GB.

T3: An information signifying that "a partition exists" is written in each of the PISA's 2d, 2e, 2f, and 2g in the DDPC 2c corresponding to the partitions on the DVD-RAM medium 6 of 5.2GB in capacity.

T4: The PISA's 2d, 2e, 2f, and 2g are allocated with drive letters

respectively as drive G, drive H, drive I, and drive J, in this instance, and the process is completed.

Furthermore, described hereafter is a case in that the DVD-RAM medium 6 of 5.2GB loaded in the DVD-RAM device 5 is replaced with another medium, i.e. a DVD-RAM medium 7 having a capacity of 2.6B.

T1: The DVD-RAM medium 7 of 2.6GB in capacity is replaced.

T2: The DDPC 2c initializes a number of areas, e.g. a number equal to or smaller than the maximum number of partitions that the operating system 2a supports, that is all of the partitions, PISA's 2d, 2e, 2f, and 2g. The DDPC 2c then checks a number of partitions the newly loaded DVD-RAM medium 7 of 5.2GB in capacity.

T3: An information signifying that "a partition exists" is written in each of the information save areas 2d, and 2e in the DDPC 2c corresponding to the partitions on the DVD-RAM medium 7 of 2.6GB in capacity. Another information signifying that "no partition exists" is written in each of the other information save areas 2f, and 2g in the DDPC 2c for nonexistent partition on the DVD-RAM medium 7 of 2.6GB in capacity.

T4: In other words, information areas on the DVD-RAM media 7 of 2.6GB capacity can be treated in a manner that:

the information area 2d is assigned as drive G' as shown by a symbol 7a: and

the information area 2e is assigned as drive H' as shown by a symbol 7b.

All other drives are recognized as being not loaded with any medium, and the process is now completed.

Described hereinafter pertains to an operation in Fig. 4, when the operating system or the file system issues read / write commands to the device driver.

U1: The computer system is activated.

U2: When the operating system 2a begins to read and write data in a drive letter I on the medium 6 in the DVD-RAM device 5, the operating system 2a issues a communication command to the file system 2b, and the file system 2b also issues a communication command to the DDPC 2c, if there is the medium 6 loaded in the DVD-RAM device 5.

U3: The DDPC 2c verifies whether the command is for one of the drive letters it manages.

U4: If the drive letter I is not found, in the step U3, as being one of the drive letters that the DDPC 2c manages, the DDPC 2c terminates the process, and returns to a process of the operating system.

U5: If the drive letter I is found, in the step U3, as being the drive letter the DDPC 2c manages, the DDPC 2c checks through the PISA's 2d, 2e, 2f, and 2g.

U6: The DDPC 2c checks whether or not a partition exists for the loaded DVD-RAM medium 6 of 5.2GB.

U7: If the drive checked in the step U6 corresponds to the partition information save area having no partition, a message is sent to

the file system 2b to the effect that no medium is prepared.

U8: If the drive checked in the step U6 corresponds to the partition information save area having a partition:

the DDPC2c communicates with the DVD-RAM device 5, and
transfers data read from the medium 6 to the file system 2b;
and

the file system 2b communicates to the operating system 2a.

U9: The processing is completed.

In addition, it is practicable with any existing computer system to form partitions in a removable device, according to this invention, through a supply of various kinds of media containing a program for creating partitions in removable devices.

Furthermore, the program for creating a plurality of partitions in removable devices can be supplied through a communication means such as the Internet and the like networks, besides supplying it stored in a variety of media.

Industrial Applicability

As described above, a method of creating partitions in a removable device of this invention avoids a problem in that drive letters do not match with individual partitions in a removable device and a variety of other devices in an operating system not capable of changing drive letters dynamically at each time a medium is replaced. It can realize a plurality of partitions in a single unit of removable device by treating it as a plurality of drives. Moreover, an operator can allocate usable

drive letters freely at his convenience, even when there is a change in number of devices connected to his computer system.

Furthermore, there can be realized a plurality of partitions readily in a removable device in an existing computer system, by offering a
5 medium containing a recorded program for creating a plurality of partitions in removable devices.

P22265Literal_DES

CLAIMS

1. A method of creating partitions in a removable device, said method being characterized by:

5 communicating between an operating system and a device driver in a computer system capable of connecting with a removable device; and

allocating drive letters in number equal to a number of plural drives to a single unit of said removable device, when said device driver
10 allocates drive letters to said operating system.

2. The method of creating partitions in a removable device according to claim 1, wherein the number of said drives is equal to a maximum number of partitions supported by said operating system.
15

3. The method of creating partitions in a removable device according to claim 2, wherein:

said drive letters allocated to the single unit of said removable device remain valid until being reallocated again; and

20 a number of drive letters derived by subtracting a number of partitions on a medium within said removable device from the number of said drive letters is recognized as being absence of any medium.

4. The method of creating partitions in a removable device
25 according to claim 1, wherein said drive letters comprise arbitrary

characters allocated by an operator.

5. A medium having a program recorded therein for creating a plurality of partitions in the removable device as recited in claim 1.

2025 RELEASE UNDER E.O. 14176

ABSTRACT

A method is provided for creating a plurality of partitions on a removable medium of a removable device connected to a computer system. When the computer is started (S1), the operating system and a device driver communicate with each other (S2). The device driver provides a plurality of drive letters for the removable device, so that the media is divided into partitions corresponding to the number of the drive letters. A drive for a media with fewer partitions is regarded to have no media loaded.

Fig.1

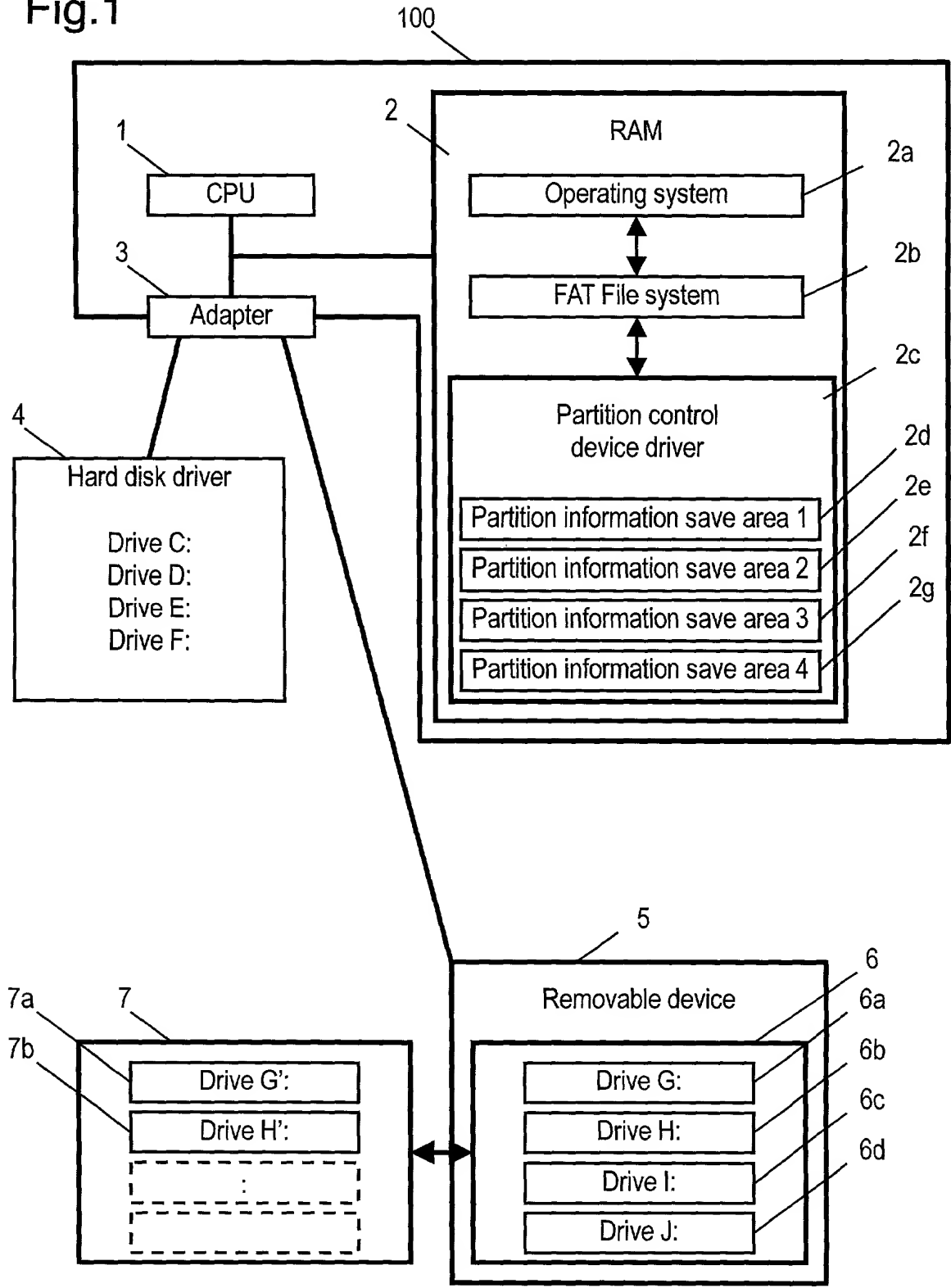


Fig.2

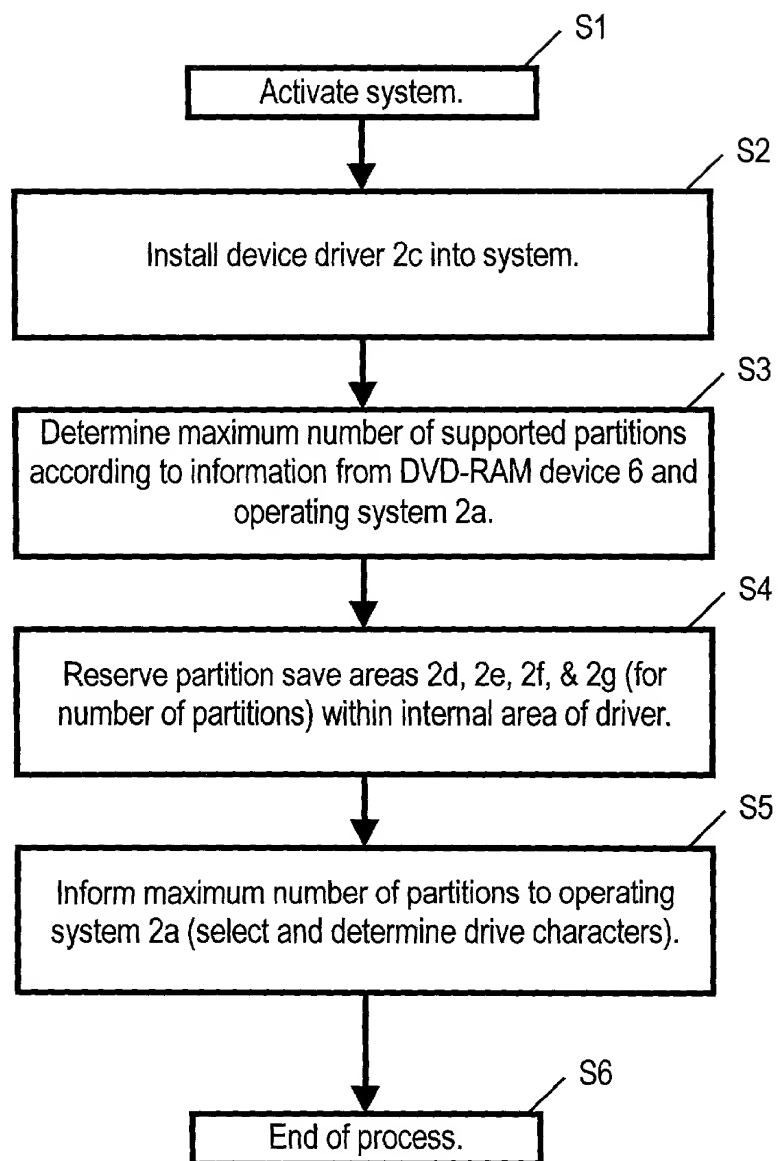


Fig.3

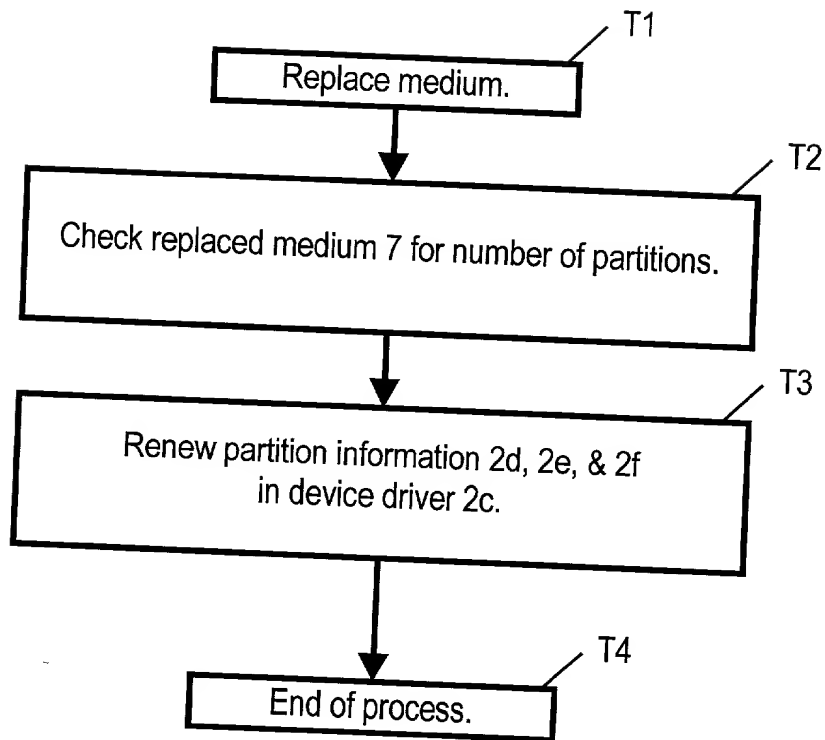
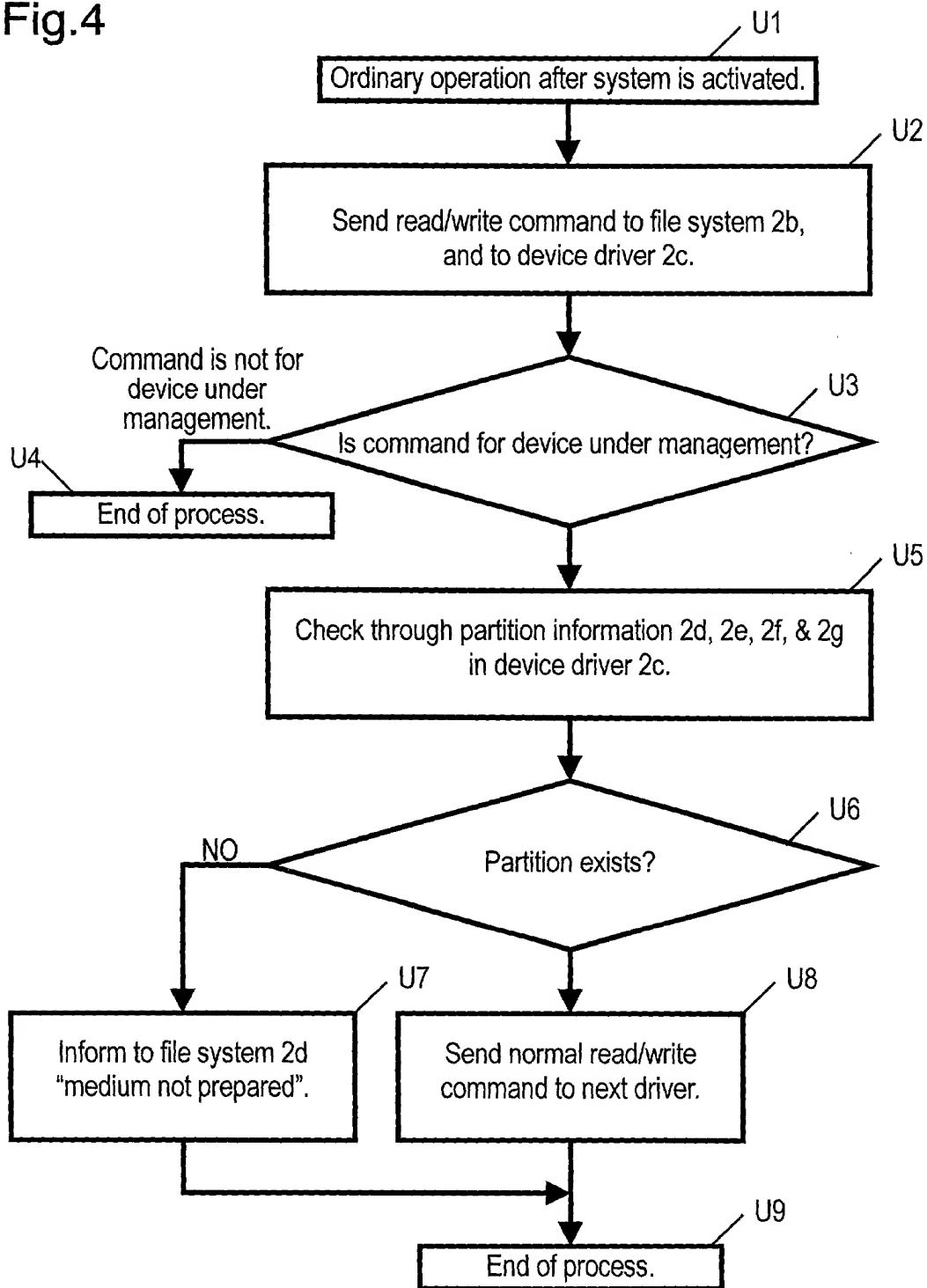


Fig.4



Reference Numerals

1. CPU
2. RAM in host computer
- 5 2a. Operating system
- 2b. File system
- 2c. Device driver
- 2e to 2g. Partition information save area
3. Adapter
- 10 4. Hard disk driver
5. DVD-RAM device
6. DVD medium of 5.2GB
- 6a. Drive G
- 6b. Drive H
- 15 6c. Drive I
- 6d. Drive J
7. DVD medium of 2.6GB
- 7a. Drive G'
- 7b. Drive H'

Declaration and Power of Attorney For Patent Application

English Language Declaration

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled METHOD OF CREATING A PLURALITY OF PARTITIONS ON REMOVABLE DEVICE, the specification of which is attached hereto unless the following box is checked:

☒ was filed on March 15, 2000 as
United States Application Number or PCT International Application Number PCT/JP00/01569
and was amended on November 15, 2000 (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR § 1.56.

I hereby claim foreign priority benefits under 35 U.S.C. § 119(a)-(d) or § 365(b) of any foreign application(s) for patent or inventor's certificate, or § 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below by checking the box, any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)

Priority Not Claimed

<u>11-073355</u>	<u>Japan</u>	<u>18 March 1999</u>	<input type="checkbox"/>
(Number)	(Country)	(Day/Month/Year Filed)	

<u> </u>	<u> </u>	<u> </u>	<input type="checkbox"/>
(Number)	(Country)	(Day/Month/Year Filed)	

I hereby claim the benefit under 35 U.S.C. § 119(e) of any United States provisional application(s) listed below.

<u> </u>	<u> </u>
(Application Number)	(Filing Date)

<u> </u>	<u> </u>
(Application Number)	(Filing Date)

I hereby claim the benefit under 35 U.S.C. § 120 of any United States application(s), or 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. § 112, I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR § 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application:

(Application Number)

(Filing Date)

(Status - patented, pending, abandoned)

(Application Number)

(Filing Date)

(Status - patented, pending, abandoned)

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith:

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Benjamin E. Leace	Reg. No. <u>33,412</u>	Louis W. Beardell, Jr.	Reg. No. <u>40,506</u>		
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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full name of sole or first inventor (given name, family name) Akiyoshi Yamashita

Inventor's signature Akiyoshi Yamashita

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